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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,799	02/09/2005	Ryoichi Ito	L8462-05106	6092
24257 7590 02/26/2007 STEVENS DAVIS MILLER & MOSHER, LLP 1615 L STREET, NW SUITE 850 WASHINGTON, DC 20036			EXAMINER MAI, ANH D	
			ART UNIT 2814	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE			MAIL DATE	
3 MONTHS			02/26/2007	
			DELIVERY MODE	
			PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/523,799	Applicant(s) ITO ET AL.	
	Examiner Anh D. Mai	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>Feb 9, 2005</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Figure 6 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. Claims 13-15 are objected to because of the following informalities:

Claims 13-15 recite additional element, e.g., **a circuit**, other than the light receiving element of claims 1, 2 and 3. Therefore, they should include the phrase "further comprises or further comprising".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention. Evidence that claims 1-15 fail(s) to correspond in scope with that which applicant(s) regard as the invention can be found in the

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specification. In that, applicant has stated: region 6 is formed by thermal oxidation or LOCOS, and this statement indicates that the invention is different from what is defined in the claim(s) because claim 1, lines 6-7 recites: “an isolation region formed by burying an insulator or a dielectric in a trench”.

Since claim 1 contradicting the disclosure, the claims are indefinite.

4. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 13-14 recites: a contact portion formed by burying a conductor in an opening which passes through the isolation region.

As an apparatus, there is no opening.

Claim 1 is indefinite because it claims the limitation which is not existed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 4, 7, 10 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Ito et al. (JP. Patent No. 2002-280536) of record.

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With respect to claim 1, Insofar as the apparatus is concerned and as best understood by the examiner, Ito teaches an optical semiconductor device as claimed including:

a plurality of light-receiving elements (1) comprised of a semiconductor region (2) of a first conductivity type and a semiconductor region (3) of a second conductivity type formed on the semiconductor region (2) of the first conductivity type;

an isolation region (6) formed by burying an insulator or a dielectric in a trench which passes through the semiconductor region (3) of the second conductivity type and which reaches the semiconductor region (2) of the first conductivity type in order to isolate the respective light-receiving elements from one another;

an electrode (15) formed on the isolation region (6); and

a contact portion formed by burying a conductor (13/14) in an opening which passes through the isolation region (6) and which reaches the semiconductor region (2) of the first conductivity type in order to electrically connect the electrode (15) and the semiconductor region (2) of the first conductivity type. (See Figs. 1, 3, 5).

Product by process limitation:

The expression “formed by burying an insulator or a dielectric in a trench” and “formed by burying a conductor in an opening” is/are taken to be a product by process limitation and is given no patentable weight. A product by process claim directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See *In re Fessman*, 180 USPQ 324, 326 (CCPA 1974); *In re Marosi et al.*, 218 USPQ 289, 292 (Fed. Cir. 1983); *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972); *In re Pilkington*, 411 F.2d 1345, 1348,

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162 USPQ 145, 147 (CCPA 1969); *Buono v. Yankee Maid Dress Corp.*, 77 F.2d 274, 279, 26 USPQ 57, 61 (2d. Cir. 1935); and particularly *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product “gleaned” from the process steps, which must be determined in a “product by process” claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old and obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not.

Note that Applicant has burden of proof in such cases as the above case law makes clear.

Insofar as the apparatus is concerned, the isolation formed by LOCOS or trench filled are the same because both are buried isolation and function the same.

With respect to claim 4, a high-concentration region (13) which contains a higher concentration (+) of impurity of the first conductivity type than the semiconductor region (2) of the first conductivity type does, is provided directly under the conductor.

With respect to claims 7 and 10, the conductor (13/14) is doped polysilicon or tungsten.

With respect to claim 13, the optical semiconductor device of Ito further includes a circuit (16) connected to the light-receiving element (1) is included on the semiconductor region (2) of the first conductivity type other than the light-receiving element-formed region (1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 3, 5, 6, 8, 9, 11, 12, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito '536 as applied to claim 1 above, and further in view of Takimoto et al. (U.S. Patent No. 6,380,603).

With respect to claim 2, Ito teaches the optical semiconductor device as described in claim 1 above including the contact portion formed by burying a conductor in the opening.

Thus, Ito is shown to teach all the features of the claim with the exception of the contact portion is surrounding each light-receiving element.

However, Takimoto teaches an optical semiconductor device including a contact portion is formed by burying a conductor (4/8) in the opening and surrounding each light-receiving element (7). (See Fig. 7).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to form the contact portion of Ito to surround the light-receiving element as taught by Takimoto to isolate the light-receiving element from the other devices.

With respect to claim 3, the semiconductor region of the first conductivity type of Takimoto comprises an upper layer (3), a middle layer (2), and a lower layer (1), the middle layer (2) contains a higher concentration (+) of impurity of the first conductivity type than the

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upper (3) and lower (1) layers do, and the opening in which the conductor (4/8) is buried is formed so as to reach the middle layer (2) of the semiconductor region of the first conductivity type.

With respect to claims 5 and 6, a high-concentration region (13) which contains a higher concentration (+) of impurity of the first conductivity type than the semiconductor region (2) of the first conductivity type does, is provided directly under the conductor.

With respect to claims 8, 9, 11 and 12, the conductor (13/14) is doped polysilicon or tungsten.

With respect to claims 14 and 15, the optical semiconductor device of Ito further includes a circuit (16) connected to the light-receiving element (1) is included on the semiconductor region (2) of the first conductivity type other than the light-receiving element-formed region (1).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



ANH D. MAI
PRIMARY EXAMINER